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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,664	05/21/2004	Min-Hsun Hsieh	KYCP0009USA1	3663

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EXAMINER
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DANG, TRUNG Q

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/709,664	HSIEH ET AL.	
	Examiner	Art Unit	
	Trung Dang	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____.  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.   | 6) <input type="checkbox"/> Other: ____.                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7, 9-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebby taken with Yang in view of Yamazaki et al., all of record.

The rejection is maintained as of record and repeated herein.

With reference to Figs. 1-2 and related text, Lebby et al. teach a method for forming a LED comprising the steps of:

forming a first stack composed of LED epitaxial layers, wherein the forming comprises following steps:

forming a first stack, wherein the step of forming a first stack comprises the steps of:

providing a first GaAs substrate 12;

forming a second contact layer 14 of GaAs on the first substrate;

forming a second cladding layer 15 on the second contact layer;

forming an emitting layer 16 on the second cladding layer;

forming a first cladding layer 17 on the emitting layer;

forming a first contact layer 18 of GaAs on the first cladding layer;

forming a transparent conductive layer 20 of indium tin oxide (ITO) on the first contact layer;

forming a second stack comprising forming a transparent adhesive layer 22 of epoxy on a second transparent substrate 25; and

holding together said first stack and said second stack by means of the transparent adhesive layer 22.

Lebby et al. differs from the claims in not disclosing:

a) the transparent adhesive layer 22 comprises at least one material selected from a group consisting of PI, BCB, and PFCB, and

b) the steps of forming a second reaction layer over the first stack, forming a first reaction layer over the second stack, and holding together said first reaction layer and said second reaction layer by means of a transparent adhesive layer as recited in the amended claim 1.

For issue a), Yang in col. 2, lines 26-27 and col. 3, lines 49-51 teaches transparent adhesive material of BCB (benzocyclobutane) is equivalent to epoxy transparent adhesive material. Thus, it would have been obvious to one of ordinary skill in the art to replace the epoxy transparent adhesive layer 22 with a transparent adhesive material of BCB as suggested by Yang because the substitution of art-recognized equivalent would have been within the level of one skilled in the art. As for the claimed transparent adhesive material of PI (polyimide), it is noted that

epoxy resin is polyimide (organic polymers). As for the claimed PFCB (perfluorocyclobutane), one skilled in the art would reasonably expect that the use of PFCB as a transparent adhesive material would yield similar result as that of BCB because BCB and PFCB are in the same family of cyclobutane.

For issue b), Yang et al. teach that in order to improve the adhesion property between a LED epitaxial structure and a transparent substrate, a layer of adhesion promoter can be formed on the surface of the LED epitaxial structure and on the surface of the transparent substrate before a transparent adhesive layer is formed thereon (col. 4, lines 1-6).

It would have been obvious to one of ordinary skill in the art to modify Lebby's process by forming an adhesion promoter layer on the surface of the LED first stack (i.e., on the ITO layer 20) and on the surface of the transparent substrate 25 (i.e., between substrate 25 and adhesive layer 22) because the presence of the adhesive promoter layer would enhance the adhesion between the LED first stack and the transparent substrate as suggested by Yang. Note that, the adhesion promoter layers formed on the LED first stack reads on the claimed second reaction layer and the adhesion promoter layer formed on the surface of the transparent substrate 25 reads on the claimed first reaction layer. Accordingly, the two adhesion promoter layers are hold together by means of the transparent adhesive layer 22.

The combined process of Lebby and Yang is now different from the claims

in not disclosing the material of the adhesion promoter layer as claimed. Yamazaki et al. teach that metal material selected from titanium (Ti) and chromium (Cr) is used to enhance the adhesive properties between a transparent substrate and an ITO transparent conductive layer (paragraph [0068]). It would have been obvious to one of ordinary skill in the art to use Ti or Cr for the adhesion promoter layer of the combined process of Lebby and Yang because this would enhance the adhesion between the transparent substrate 25 and the ITO transparent conductive layer 20 of the LED structure depicted in Lebby's Fig. 6.

For claim 3, see Fig. 3 and col. 4, lines 54-55 for the removal of the first substrate 12. Also, see Fig. 4 for the etching of the second contact layer 14, the second cladding layer 15, the emitting layer 16, the first cladding layer 17, and the first contact layer 18. See Fig. 6 for the forming of a first electrode 30 on the second contact layer 14, and a second electrode 32 on the transparent conductive layer 20.

For claims 5 and 6, although Lebby et al. disclose an AlGaAs LED, Yang et al. in column 3, lines 1-12 teach an AlGaInP LED that uses compound semiconductor materials for the contact layer, the first and second cladding layers, and the emitting layer as recited in the pending claims 5 and 6. Thus, it would have been obvious to one of ordinary skill in the art to use the compound semiconductor materials of the pending claims 5 and 6 for the aforementioned layers as taught by Yang because it is known to use such materials in the fabrication of a LED device having a wave

length of 635nm (Yang, col. 4, lines 33-34), and the employment of a known material to make the same would have been within the level of one skilled in the art.

As for claims 12 and 13, since the materials for the first reaction layer, the second reaction layer, and the transparent adhesive layer taught in the combined teaching are identical with that of disclosed in the present invention, the mechanism by which the layers are bonded together must inherently be the same, absent evidence to the contrary.

### ***Response to Arguments***

3. Applicant's arguments filed 4/3/06 have been fully considered but they are not persuasive.

In the Remarks, applicants argue that the prior art does not teach that the first and second reaction layers comprising SiNx, Ti, or Cr enhances adhesion (emphasis added) with a transparent adhesive layer comprising PI, BCB, PFCB. Although Yang and Yamazaki teach the materials Ti, Cr, and BCB, none of the prior art references teach adhering reaction layers comprising SiNx, Ti, or Cr with a transparent adhesive layer comprising PI, BCB, or PFCB as is claimed in the currently amended claim 1.

The Examiner respectfully disagrees for the following reason:

Nowhere in the amended claim 1 has recited limitation regarding the adhesion property of SiNx, Ti, or Cr with respect to the transparent adhesive layer comprising PI, BCB, PFCB. That is the SiNx, Ti, or Cr enhances adhesion with transparent

adhesive layer of PI, BCB, or PFCB as alleged by applicants. All that is called for in the claim is the holding of the first reaction layer (comprises SiNx, Ti, or Cr) and the second reaction layer (comprises SiNx, Ti, or Cr) by means of a transparent adhesive layer of PI, BCB, or PFCB. And this is exactly what the combination teaches as explained in the rejection. That is, in light of Yang's teaching, one of ordinary skill in the art would be motivated to form an adhesion promoter layer on the surface of the LED first stack (i.e., on the ITO layer 20) and on the surface of the transparent substrate 25 (i.e., between substrate 25 and adhesive layer 22) because the presence of the adhesive promoter layer would enhance the adhesion between the LED first stack and the transparent substrate as suggested by Yang. Note that, the adhesion promoter layer formed on the LED first stack reads on the claimed second reaction layer and the adhesion promoter layer formed on the surface of the transparent substrate 25 reads on the claimed first reaction layer. Accordingly, the two adhesion promoter layers are hold together by means of the transparent adhesive layer 22. The materials of the first and second adhesion promoter layers being of Ti or Cr are provided by the teaching of Yamazaki, and the materials of the transparent adhesive layer 22 being of PI, BCB, or PFCB are provided by the teaching of Yang. Consequently, the two adhesion promoter layers (corresponding to the claimed first and second reaction layers) of Ti or Cr are hold together by means of a transparent adhesive layer 22 of PI, BCB, or PFCB.



***Conclusion***


4. This is a RCE of applicant's earlier Application No. 10/709,664. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Trung Dang  
Primary Examiner  
Art Unit 2823

06/11/06